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Revised Taxonomy of Some Species of the Genus *Okenia* Menke, 1830 (Mollusca: Nudibranchia) from the Atlantic Ocean, with the Description of a New Species

by

ÁNGEL VALDÉS AND JESÚS ORTEA

Departamento de Biología de Organismos y Sistemas, Laboratorio de Zoología,
Universidad de Oviedo, 33005 Oviedo, Asturias, Spain

Abstract. Information on several species in the genus *Okenia* Menke, 1830 (*O. quadricornis, O. mediterranea, O. zoobotryon, O. impexa,* and *O. cupella*), is presented and their taxonomic relationships are discussed. *Okenia* ***hispanica***, a new species from the Alborán Sea, is described. New data is given on the biology and geographical distribution of the above species.

INTRODUCTION

Marcus (1957) listed the species belonging to the genus *Okenia* Menke, 1830. In the same paper, he described two new species of this genus, collected in Brazil, namely *O. impexa* and *O. evelinae*. Marcus assigned nine species in the Atlantic Ocean (including the Caribbean, the Mediterranean, and the North Sea) to the genus *Okenia*.

Since then, several new species from this geographic area have been described, namely *Okenia sapelona* Marcus & Marcus, 1967; *O. cupella* (Vogel & Schultz, 1970); *O. ascidicola* Morse, 1972, and *O. pusilla* Sordi, 1974.

A review of the current literature reveals enormous confusion regarding the taxonomy of these species, this being caused primarily by inadequate anatomical study, or by none at all.

In this paper, the taxonomic relationships of various Atlantic species of the genus *Okenia* will be explored on the basis of material collected from Cape Verde, Cuba, Spain, and Italy during several scientific trips.

SPECIES DESCRIPTIONS

Okenia quadricornis (Montagu, 1815)

(Figure 1)

Original reference: *Doris quadricornis* Montagu 1815, 11: 17, pl. IV, fig. 4.

Synonyms: *Idalla caudata* Ørested 1844. *Idalia inaequalis* Forbes & Hanley 1851. *Idalia aspersa* Alder & Hancock 1845. *Idalia pulchella* Alder & Hancock 1854. *Idalia modesta* Verrill, 1875. *Okenia ascidicola* Morse 1972.

Material examined: Acitrezza, Sicily Island, Italy (37°30'N, 15°10'W), 32 m depth, 7 March 1990, 1 specimen, 3.5 mm long, SICILIA-90 expedition.

Description: The body has a background color of hyaline white (Figure 1A). The dorsum has yellow spots, and these are edged with opaque white and brown in the mid-dorsal area. The lateral part of the dorsum is white and yellow, and has several brown spots. There are long spicules in the foot, which is opaque white in color. The velum bears four appendages, similar in color to the notum, and which in our specimen are very short. There are five papillae along each pallial edge. These have the same color pattern as the dorsum. There are six branchial gills, which are white with yellow and brown spots, encircling the anus.

The lateral teeth have strong denticles. The marginal teeth are hook-shaped, and lack denticles (Figure 1B). Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

Biology: *Okenia quadricornis* feeds upon the ascidians *Molgula occulta* Kupffer, 1875, in Europe (Thompson, 1988), and *Molgula manhattensis* (De Kay, 1843) in North America (Morse, 1972).

The spawn is a long gelatinous ribbon with an average

of around 15,000 white eggs (Just & Edmunds, 1985). The egg ribbon spawned by a 15 mm specimen from Denmark was 16 mm long (Just & Edmunds, 1985), and that by a 12 mm specimen from the United States was 6 mm long (Morse, 1972).

According to Thompson & Brown (1984), the greatest depth from which this species has been collected is 60 m, at Holy Island (the North Sea) by Walton in 1908.

Distribution: Since Montagu's original description of a specimen collected in Devonshire, Great Britain (Montagu, 1815), this species has been reported from the Shetland Islands (Thompson & Brown, 1984; Platts, 1985), Norway (Odhner, 1922; Thompson & Brown, 1984; Just & Edmunds, 1985; Platts, 1985), Sweden (Odhner, 1907; Just & Edmunds, 1985; Platts, 1985), Denmark (Thompson & Brown 1984; Just & Edmunds, 1985; Platts, 1985), Ireland (Platts, 1985), Great Britain (Alder & Hancock, 1845; Pruvot-Fol, 1954; Thompson & Brown, 1984; Thompson, 1988; Just & Edmunds, 1985; Platts, 1985), the French Atlantic coast (Labbé, 1931; Vayssière, 1913; Pruvot-Fol, 1954; Bouchet & Tardy, 1976) and Portugal (Cervera et al., 1991). Also, there have been four records from North America: Verrill (1875) in New England, Verrill (1879) in New York, and Verrill (1882) and Morse (1972) in Massachusetts.

Records also exist for several localities around the Mediterranean Sea (Poizat, 1978; Schmekel & Portmann, 1982; Cattaneo-Vietti & Barletta, 1984; Cattaneo-Vietti & Thompson, 1989).

Remarks: Montagu (1815:17) described *Doris quadricornis* as follows: "Body ovate mottled brown and white; along each side an obsolete row of tubercles, somewhat dilatable, extending from the tentacula to the vent; tentacula four, long, both pairs originating from the upper part, and approximating; the anterior shortest setiform, inclining forwards; the others filiform, reflecting backwards, the same color as the body. Vent situated near the extremity of the back, surrounded with eight or nine branched appendages." However, he appears to have depicted only two velar appendages and no lateral papillae.

Alder & Hancock (1845) described *Idalia aspersa* as having the same features as *Okenia quadricornis*. However, they made a distinction between both *O. quadricornis* and *O. aspersa* because they felt that the former had only two velar appendages.

Other authors (Thompson & Brown, 1984; Cervera et al., 1991), following Alder & Hancock's idea, suggested that both *O. aspersa* and *O. quadricornis* were two different species. On the contrary, Pruvot-Fol (1954), Bouchet & Tardy (1976), and Schmekel & Portmann (1982) reached the opposite conclusion. On the basis of the external features described in the original text by Montagu (1815) and Alder & Hancock (1845), we feel that both species are identical.

A review of the literature reveals that other nominal species of *Okenia,* namely *Idalia caudata* Ørested, 1844,

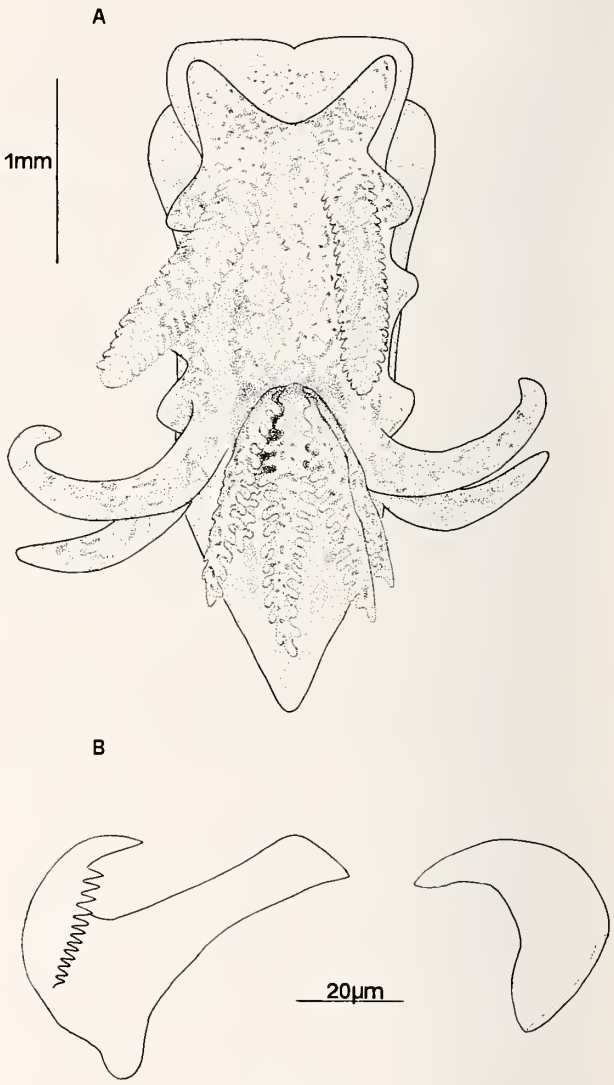

Figure 1.

Okenia quadricornis, A. dorsal view of the living animal, B. radular teeth of a half row.

Idalia inaequalis Forbes & Hanley, 1853, *Idalia modesta* Verrill, 1875 and *Okenia ascidicola* Morse, 1971 have been considered synonyms of *O. quadricornis* by the majority of authors. However, there has been some confusion surrounding the taxonomic status of *O. pulchella* Alder & Hancock, 1854. Following Lemche (1971), *O. pulchella* is a synonym of *O. aspersa* and consequently of *O. quadricornis* (see above). According to Pruvot-Fol (1954) and Thompson & Brown (1984), both *O. pulchella* and *O. aspersa* are different species, although both species possess an identical color pattern and radular tooth shape. Thompson & Brown (1984) described one specimen of *O. pulchella* whose radular teeth differed from those of *O. quadricornis,* but were identical to those of *O. elegans*. It is probable that Thomp-

Table 1

Radular formulae described for the Atlantic species of the genus *Okenia* studied in this paper.

Species	Locality	Animal length	Radular formula	References
O. quadricornis	England	22 mm	35x(1.1.0.1.1)	Colgan, 1914
	Massachusetts (USA)	12 mm	24x(1.1.0.1.1)	Morse, 1972
	Naples (Italy)	2 mm	24x(1.1.0.1.1)	Schmekel & Portmann, 1982
	England	10 mm	25x(1.1.0.1.1)	Thompson & Brown, 1984
	Sagres (Portugal)	8 mm	26x(1.1.0.1.1)	Cervera et al., 1991
	Sicily (Italy)	3.5 mm	22x(1.1.0.1.1)	present paper
O. mediterranea	Naples (Italy)	8 mm	30x(1.1.0.1.1)	Ihering, 1886
	Georgia (USA)	7.6 mm	12x(1.1.0.1.1)	Marcus & Marcus, 1967
	Naples (Italy)	5 mm	18x(1.1.0.1.1)	Schmekel, 1979
	Huelva (Spain)	8.5 mm	25x(1.1.0.1.1)	Cervera et al., 1991
	Sicily (Italy)	3 mm	13x(1.1.0.1.1)	present paper
	Tarifa (Spain)	7 mm	18x(1.1.0.1.1)	present paper
	Vigo (Spain)	15 mm	41x(1.1.0.1.1)	present paper
O. zoobotryon	Bermuda	5 mm	33x(1.1.0.1.1)?	Smallwood, 1910
	Bermuda	6 mm	35x(1.1.0.1.1)?	Smallwood, 1910
	Ubatuba (Brazil)	8 mm	28x(1.1.0.1.1)	Marcus, 1957
	Cuba	3 mm	17x(1.1.0.1.1)	present paper
O. impexa	Brazil	3 mm	17x(1.1.0.1.1)	Marcus, 1957
	Cuba	2.5 mm	18x(1.1.0.1.1)	present paper
O. cupella	Virginia (USA)	2 mm	10x(1.1.0.1.1)	Vogel & Schultz, 1970
	Banyuls (France)	4 mm	15x(1.1.0.1.1)	Schmekel, 1979
	Palos Cape (Spain)	3 mm	13x(1.1.0.1.1)	present paper
O. ***hispanica*** n. sp.	Alborán (Spain)	9 mm	20x(1.1.0.1.1)	present paper

son & Brown (1984) mistakenly studied a specimen of this latter species.

Okenia quadricornis is distinguished from other Atlantic species by the shape of is radular teeth, and externally by its smooth dorsum, which lacks papillae. *Okenia* ***hispanica*** sp. nov. (see below) is the only other species with a smooth dorsum. However, both species can be differentiated by their external coloring.

Okenia mediterranea (Ihering, 1886)

(Figures 2–3)

Original reference: *Idalia mediterranea* Ihering 1886, 8:39–46, figs. 11–13.

Synonyms: ?*Okenia sapelona* Marcus & Marcus 1967.

Material examined: Trafalgar (Fauna Ibérica I cruise), Spain (36°08′N, 6°01′W), 34 m depth, 20 July 1989, 1 specimen, 6 mm in length. Straits of Gibraltar (Fauna Ibérica I cruise), Spain (36°03′N, 5°41′W), 12 m depth, 21 July 1989, 1 specimen, 7 mm long. Acitrezza, Italy (37°30′N, 15°10′E), 35 m depth, 3 May 1990, 1 specimen, 3 mm long. Vigo, Spain (42°12′N, 9°17′W), September 1990, 7 specimens, 10 to 15 mm long. Madeira, Portugal (32°50′N, 16°17′00″W), 1993, 1 specimen.

Description: The background color of the body is white (Figure 2A). Juveniles possess a single yellow line on the dorsum. In larger animals, up to three yellow lines, usually broken or interrupted, may occur. Generally, red spots edge these lines.

Juveniles lack tubercles on the dorsum. As the animal grows, it develops four small tubercles in the mid-dorsal area. In larger animals, several tubercles occur in the dorsum, along the three yellow lines.

The tail is white and bears a central yellow line, edged with red spots in larger animals.

There are nine branchial leaves, white with a yellow rachis, in a 15 mm-long specimen. The lamellate rhinophores are longer, and white in color. The velum bears four appendages, orange in the Mediterranean, and yellow in the Atlantic specimens. Five tentacular papillae, with the same color as the dorsum, occur along each pallial edge, the last one being bifid. The oral tentacles are long, white in color, with a yellow spot at the apex.

The reproductive system (Figure 2D) has a gametolytic gland larger than the seminal receptacle. The penis bears nine rows of hooks.

The jaw elements (Figure 2C) are short, with one to five cusps. The lateral tooth (Figure 3) bears several fine denticles. There is one cusp in the marginal tooth. Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

Biology: The prey of *O. mediterranea* consists of bryozoans such as *Alcyonidium mytili* Dalyell, 1848 (Cervera et al.,

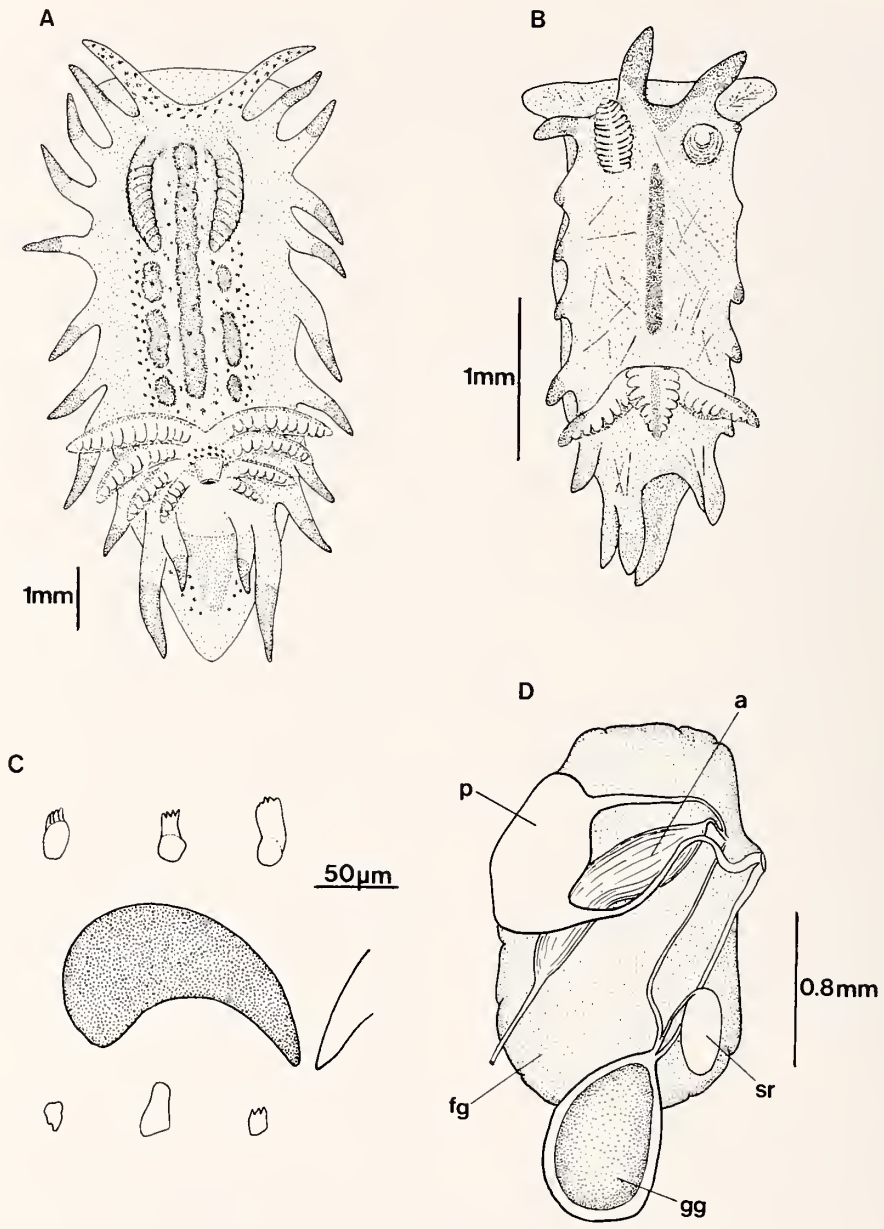

Figure 2

Okenia mediterranea, A. dorsal view of one specimen from Vigo, B. dorsal view of the juvenile specimen from Sicily, C. lateral view of the labial cuticle and detail of some elements, D. reproductive system: a, ampulla; fg, female gland; gg, gametolytic gland; p, prostate; sr, seminal receptacle.

1991). According to Cattaneo-Vietti et al. (1990), this species feeds on the octocoral *Paramuricea clavata* (Risso, 1826).

The spawn (Cervera et al., 1991) is a ribbon 10 to 12 mm long. The eggs are white in color, and their diameter is 58.5 to 78 µm.

Distribution: This species is known to inhabit Mediterranean waters (Ihering, 1886; Pruvot-Fol, 1951; Pruvot-Fol, 1954; Schmekel, 1979; Barletta & Melone, 1976; Schmekel & Portmann, 1982; Cattaneo-Vietti & Barletta, 1984; Cattaneo-Vietti & Thompson, 1989; Cattaneo-Vietti et al., 1990).

Recently, Cervera et al. (1991) reported several specimens from Gibraltar, the first occurrence reported from the Northeastern Atlantic.

This is probably an amphiatlantic species and conspe-

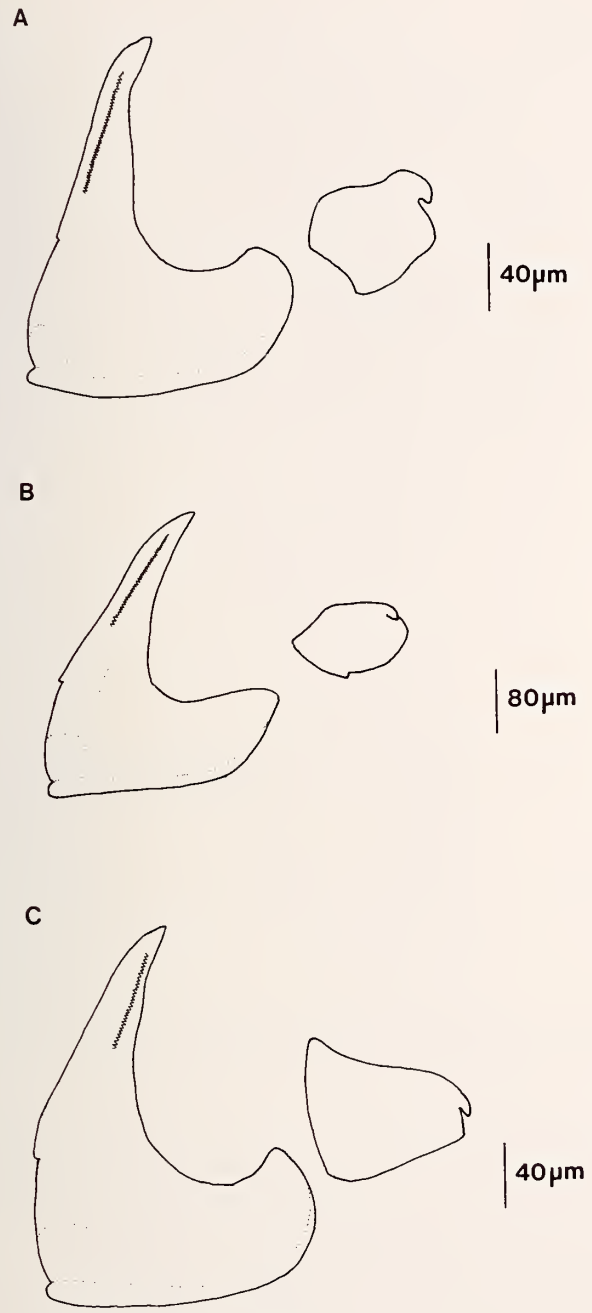

Figure 3

Okenia mediterranea, A. radular teeth of a half row of one specimen from Gibraltar Straits, B. radular teeth of a half row of one specimen from Vigo, C. radular teeth of a half row of one specimen from Sicily.

cific with *Okenia sapelona* Marcus & Marcus, 1967, described from Georgia, USA.

Remarks: Ihering (1886) defined *O. mediterranea* as: "Mantel nur am Rande mit Anhängseln, deren hinterste gespalten sind," which translates as: "The mantle only bears papillae around its edge, the last two of which are close together." However, Ihering depicted an animal with four small tubercles on the back.

Schmekel (1979), based on Ihering's German text, suggested that *O. amoenula* (Bergh, 1907), which always has a smooth back (see below), is a synonym of *O. mediterranea,* ignoring other anatomical features which clearly differentiate both species.

On the other hand, Cervera et al. (1991) studied several specimens of *O. mediterranea* from the Iberian Peninsula and suggested that their material could belong to a different species. The confusion surrounding this species arises from the fact that as the animal grows, its external features change. The younger specimens have a smooth notum with a yellow central line. However, older specimens bear small papillae and three yellow lines on the notum.

Okenia sapelona Marcus & Marcus, 1967 described from Georgia, USA, appears to be very close to *O. mediterranea.* The radular morphology, the shape of the body, and the coloring of both species are very similar; only a bluish tone, reported in the original description of *O. sapelona* (Marcus & Marcus, 1967), distinguishes between specimens from opposite sides of the Atlantic Ocean. Nevertheless, examination of material from both Atlantic coasts is necessary before they can be confirmed as synonyms.

The color pattern of *O. mediterranea* clearly distinguishes this species from Atlantic congeners. Other species which bear small papillae on the dorsum are *O. elegans* and *O. zoobotryon,* but both species have the radular teeth shaped very differently from *O. mediterranea.*

Okenia zoobotryon (Smallwood, 1910)

(Figure 4)

Original reference: *Polycerella zoobotryon* Smallwood 1910, 143–145, fig. 10.

Synonyms: *Okenia evelinae* Marcus 1957.

Material examined: 1 specimen, Diego Pérez Key, Cuba (20°40'N, 79°25'W), 3 mm in length, 8 July 1988.

Description: The background color of the body is translucent white (Figure 4A). There are pale brown spots over the entire dorsum. The tail is similar in color to the dorsum, with opaque white spots. The oral tentacles are white with no spots. The velum bears two appendages. There are five papillae on each pallial edge. Also, there are nine papillae in the mid-dorsal area. All these papillae are shaped like chess pawns. The rhinophores are very large (Figure 4B), white in color with dark brown and opaque white spots. There are three branchial leaves in the specimen studied, pure white in color.

The lateral radular tooth (Figure 4C) has 14 strong denticles, which decrease in size toward the apex. The marginal tooth has two cusps. Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

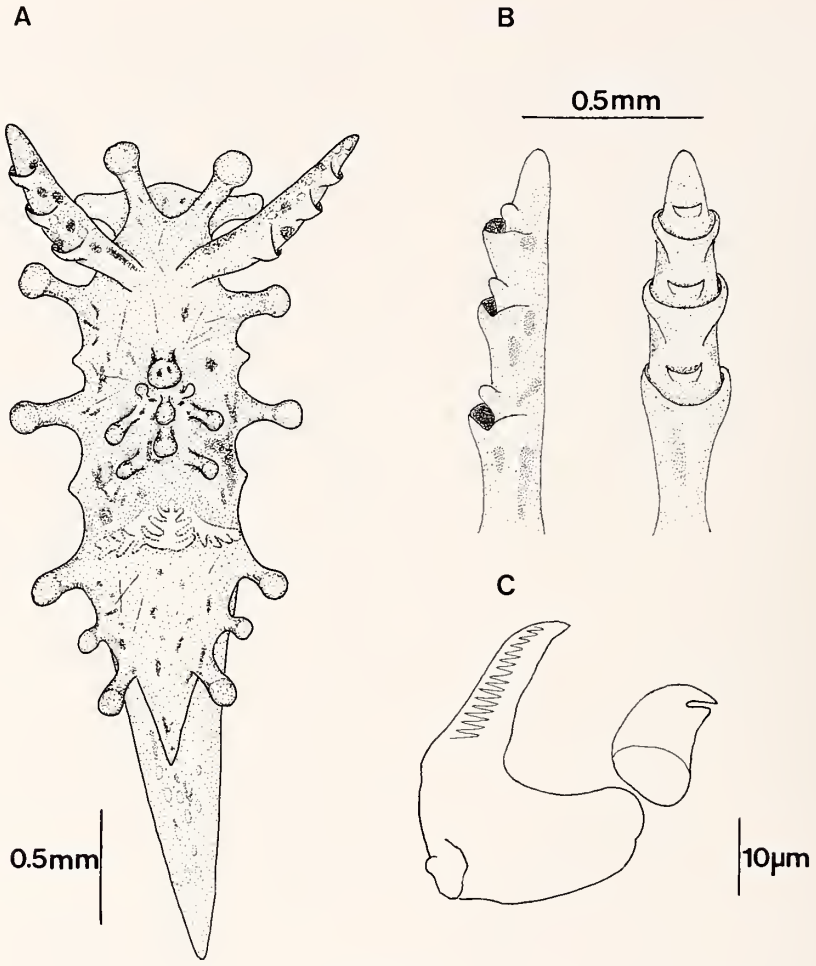

Figure 4

Okenia zoobotryon, A. dorsal view of the living animal, B. detail of the rhinophores in lateral and posterior view, C. radular teeth of a half row.

Biology: Two bryozoan species have been reported as the food of this species, *Zoobotryon verticillatum* (=*Z. pellucidum*) (Delle Chiaje, 1816) according to Smallwood (1910), and *Amathia convoluta* Lamouroux, 1841, after Marcus (1957).

The spawn is a cylindrical gelatinous mass with the number of eggs varying between 100 and 300 (Smallwood, 1910). However, Clark & Goetzfried (1978) have studied spawn masses of this species with 1200 eggs, 60.1 µm in diameter.

Distribution: This species is presently known to inhabit the western Atlantic Ocean. Type material was described from Bermuda (Smallwood, 1910), and localities recorded from Southern Brazil (Marcus, 1957, 1958), Florida, USA (Marcus & Marcus, 1960), Curaçao Island (Marcus & Marcus, 1970), Panama (Meyer, 1977), and Barbados (Edmunds & Just, 1985). Ours is the first record from Cuba.

Remarks: Smallwood (1910) described *O. zoobotryon* from Bermuda, and included it in the genus *Polycerella* Verrill, 1880, because he found a radular formula with one lateral tooth and two marginal teeth. On the basis of the odd radular formula described by Smallwood, Odhner (1941) suggested that this species should be considered the type of the new genus *Bermudella* Odhner, 1941, characterized by the radular formula n x(2.1.0.1.2).

Marcus (1957) collected several specimens of this species from Brazil, and described them as new under the name *Okenia evelinae* Marcus, 1957. This time, the radular teeth were correctly described, with a formulae n x(1.1.0.1.1). Clark (1984), with material from the type locality, redescribed Smallwood's species including it in the genus *Okenia,* and considered *Okenia evelinae* a synonym of *O. zoobotryon.* Our material is identical to Clark's redescription.

The features which distinguish *O. zoobotryon* from other Atlantic species of *Okenia* include its pawn-shaped papillae and the morphology of the radular teeth. Also, the rhin-

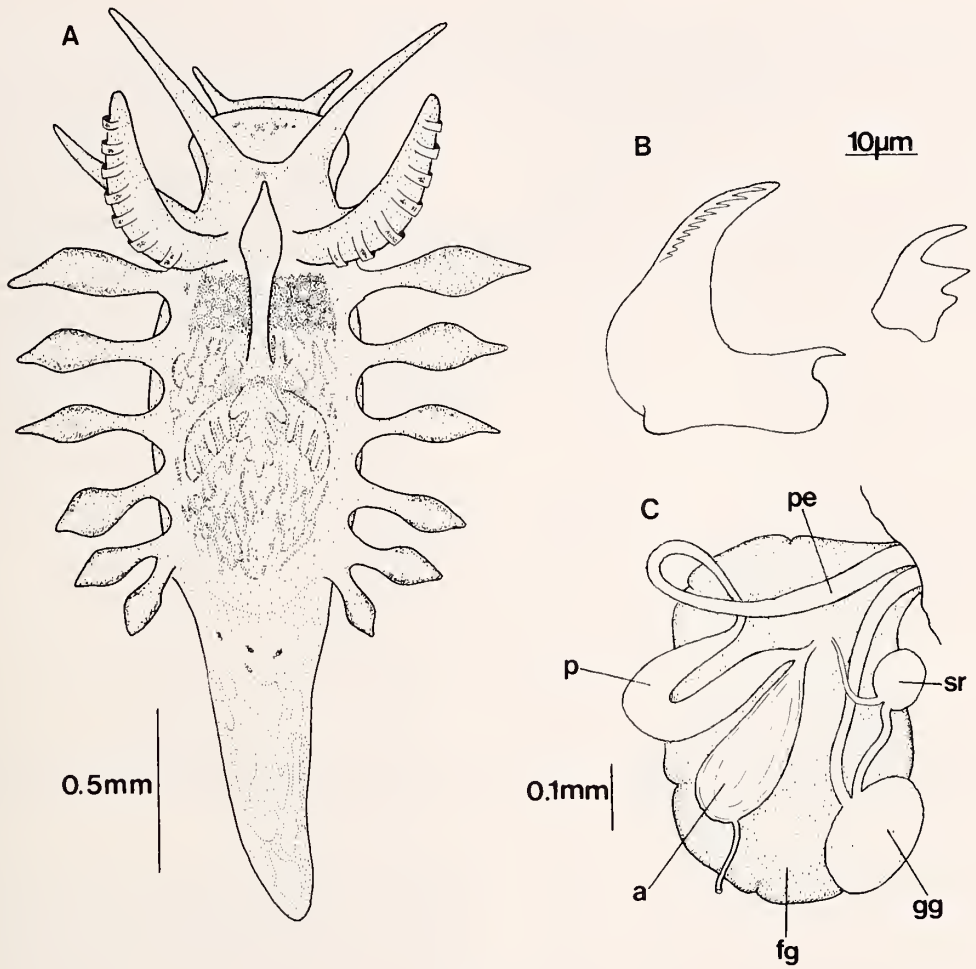

Figure 5

Okenia impexa, A. dorsal view of the living animal, B. radular teeth of a half row, C. reproductive system: a, ampulla; fg, female gland; gg, gametolytic gland; p, prostate; pe, penis; sr, seminal receptacle.

ophoral clavus lamellae of *O. zoobotryon* differ from those of other species (see Figure 4B).

Okenia impexa Marcus, 1957

(Figure 5)

Original reference: *Okenia impexa* Marcus 1957, 43:434–438, figs. 120–127.

Material examined: Flamenco Key, Cuba (20°40′N, 79°20′W), 3 m depth, 9 July 1988, 1 specimen, 2.5 mm long. Palmeira, Sal Island, Cape Verde (18°20′N, 22°30′W), 8 August 1985, 2 specimens, 1 mm long.

Description: The specimen from Cuba has a background color of hyaline white (Figure 5A), with opaque white and brown spots. There is a large dark brown patch in the middle of the notum, which bears pale spots. The specimens from Cape Verde are white in color with two large patches on the notum. Each rhinophoral clavus has seven and five lamellae in the specimens from Cuba and Cape Verde, respectively. Four large appendages are located on the velum. The pallial edge bears six pike-shaped papillae along each side of the body, similar in color to the notum. There is a single large papillae in the middle of the notum similar in shape to the others. All the animals studied had three branchial leaves.

The reproductive system (Figure 5C) possesses a gametolytic gland twice as large as the serially arranged seminal receptacle. The prostatic portion of the vas deferens is quite short.

There are no jaws. There are 10 strong denticles on the lateral radular teeth (Figure 5B) which increase in size toward the apex. The marginal teeth bear three cusps. Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

Table 2

Characteristic features of the Atlantic species of the genus *Okenia*.

Species	Body color	Velar appendages	Dorsal papillae	Lateral papillae	Presence of oral tentacles	Cusps of the marginal teeth	Presence of jaws
O. quadricornis	white with yellow and brown spots	four, white, yellow, and brown	none	conical, white, yellow and brown	−	1	+
O. elegans	rose with white and yellow spots	two or four yellow with red spots	some small papillae	conical, yellow with red spots	+	1	+
O. leachi	white with pink spots	four, white	some tentacular papillae	tentacular, white	−	1	+
O. mediterranea	white with yellow and red spots	two, yellow with red spots	some small papillae	tentacular, yellow, red and white	+	1	+
O. zoobotryon	white with brown spots	two, white with brown spots	some papillae, chess pawn-shaped	pawn-shaped, white with brown	+	2	−
O. impexa	white with brown spots	four, white with brown and yellow spots	single large papilla	pike-shaped, white with brown	+	3	−
O. cupella	white with brown spots	two or four white with brown spots	single large papilla	club-shaped, white with brown	+	2	−
O. ***hispanica*** n. sp.	white with pink and yellow spots	four, yellow and white	none	conical, yellow and white	+	1	+

Biology: The spawn of *O. impexa* is a 3 mm long mass, which contains 560 white eggs (Eyster, 1980).

Distribution: At present, *O. impexa* has been recorded from São Sebastião Island, Brazil (Marcus, 1957), North Carolina, USA (Marcus, 1961; Eyster, 1980), and Puerto Rico (Marcus & Marcus, 1970). Ours is the first record from the Eastern Atlantic Ocean.

Remarks: Anatomical features which distinguish *O. impexa* from other Atlantic species of this genus include its pike-shaped papillae and marginal radular teeth with three denticles. Our material from Cuba and Cape Verde is identical to that of the original description (Marcus, 1957).

Okenia cupella (Vogel & Schultz, 1970)

(Figure 6)

Original reference: *Cargoa cupella* Vogel & Schultz 1970, 390–393, figs. 1–5.

Synonyms: *Okenia pusilla* Sordi 1974.

Material examined: Cape Palos, Spain (36°35′N, 0°40′W), 5 m depth, 7 May 1988, 1 specimen, 3 mm in length, collected on the alga *Codium vermilara* (Olivi) Delle Chiaje (1829) with spawn. Alborán Island, Spain (35°57′N, 3°00′W), 6 m depth, 1 specimen, 4 mm in length, collected on the bryozoan *Margaretta ceroides* Gray, 1843.

Description: The background color of the body is pale cream, with an irregular brown spotted pigmentation. There are four long appendages on the velum (Figure 6A). The pallial edge has several club-shaped papillae along each side of the body, which increase in size toward the tail. In the middle of the notum, there is a single club-shaped papillae. All these papillae are pale cream with small pale brown spots. The clavus of the rhinophores are long and yellow white in color. They bear seven cuplike lamellae projecting from the rear edge. There are four branchial gills with the same color as the body.

Eighteen small denticles occur on the lateral radular tooth, which increase in size towards the apex (Figure 6C). The marginal tooth has two blunt cusps. Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

Biology: *Okenia cupella* has been collected on the sessile phase of the scyphozoan *Chrysaora quinquecirha* (Desor, 1851) by Vogel & Schultz (1970) and on the bryozoan *Margaretta cereoides* Gray, 1843 (present paper), which is probably its prey.

The spawn (Figure 6B) is a gelatinous bean-shaped mass with 40 white eggs in a 2 mm specimen (Vogel & Schultz, 1970), and 62 eggs in a 3 mm specimen (present paper).

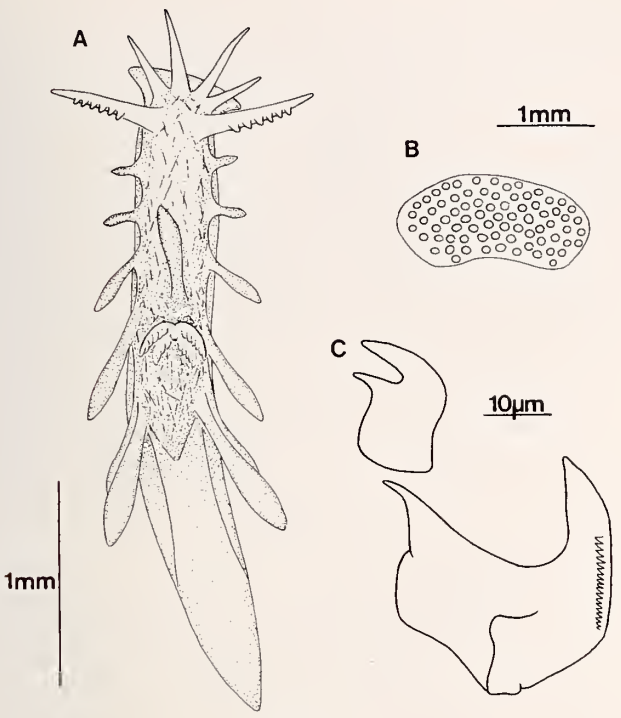

Figure 6

Okenia cupella, A. dorsal view of the living animal, B. spawn, C. radular teeth of a half row.

Distribution: *Okenia cupella* has been reported in Virginia, USA (Vogel & Schultz, 1970); Maryland, USA (Marcus, 1972); Ischia, Italy (Sordi, 1974); Naples, Italy (Schmekel, 1979); Banyuls, France (Schmekel, 1979), and Cape Palos, Spain (Templado, 1982).

Remarks: Vogel & Schultz (1970) described *O. cupella* as the type species of the new genus *Cargoa.* However, an *a posteri* resolution of the International Commission on Zoological Nomenclature to a proposal by Burn (1971), considered *Cargoa* a synonym of *Okenia.* The only Atlantic species of the genus *Okenia* which also bears a single dorsal papilla is *O. impexa.* For this reason, Burn (1971) suggested that *O. cupella* was a junior synonym of *O. impexa* Marcus, 1957. On the contrary, Marcus (1972) believed *O. cupella* to be a valid species. We agree with Marcus' hypothesis because both species have several differences. First, the shape of the lateral papillae is different (club-shaped in *O. cupella* and pike-shaped in *O. impexa*). Also, their marginal radular teeth are different: in *O. cupella,* they have two denticles, whereas in *O. impexa* there are three. Finally, the coloration is different; *O. cupella* has small brown spots irregularly distributed on its body, whereas *O. impexa* has one or several big brown spots.

Schmekel (1979) and Templado (1982) reported specimens of *O. cupella* from the Mediterranean Sea under the name *O. impexa,* because those specimens had four velar appendages, whereas the holotype had only two. The variability of the number of velar appendages and their increase paralleling the growth of the animal is common in other species of this genus.

On the other hand, Sordi (1974) described the species *O. pusilla* Sordi, 1974, based on a single specimen of *O. cupella.* The single specimen which was studied by this author lacks the central appendage, although the rest of its features were identical to those of *O. cupella.* The body color, radular morphology, and papillae shape described by Sordi, are identical to our material and the original description of *O. cupella.*

Okenia ***hispanica*** Valdés & Ortea, sp. nov.

(Figure 7)

Material examined: Holotype: Alborán Sea (Fauna Ibérica I cruise), Spain (39°19'N, 5°13'W), 16 July 1989, 1 specimen, 9 mm in length. Deposited in the collections of the Museo Nacional de Ciencias Naturales of Madrid (Spain), with the registration number: 15.05/17896.

Description: The background color of the body is hyaline white (Figure 7A, B). The notum possesses several pink patches. The two largest ones occur just behind each rhinophoral clavus. Also, there is a large pink patch on the anal area. The velum bears four long appendages, yellow in color, with the apex being white. The pallial edge possesses seven short papillae on each side of the body. There are five white branchial leaves with yellow tips. The short oral tentacles are white. There is a yellow line on the white tail.

The reproductive system (Figure 7E) has a spherical gametolytic gland, similar in size to the seminal receptacle. The penis bears 12 rows of hooks.

The jaw elements (Figure 7C) are long, and bear three to seven cusps. There are strong denticles on the lateral radular teeth (Figure 7D). Each marginal tooth has one cusp. Table 1 contains all the radular formulae recorded for this species. Table 2 summarizes the characteristic features of this species.

Distribution: *O.* ***hispanica*** is presently known to inhabit the Alborán Sea. This species was collected on stones at 60 m depth.

Etymology: The name of this species is derived from Hispania, the Latin name for Spain.

Remarks: *Okenia* ***hispanica*** is similar in color to *O. amoenula* Bergh, 1907, another Atlantic species with a smooth dorsum. Nevertheless, Bergh (1907) and Gosliner (1987) described specimens of *O. amoenula* as crimson and yellow in color, and MacNae (1957) as brick red and yellow, whereas in our species is pink and yellow. Internally, both species can be distinguished by the structure of the genital system and in the number of cusps in the jaws' denticles (3–7 in *O.* ***hispanica*** and 1 in *O. amoenula*). It is difficult

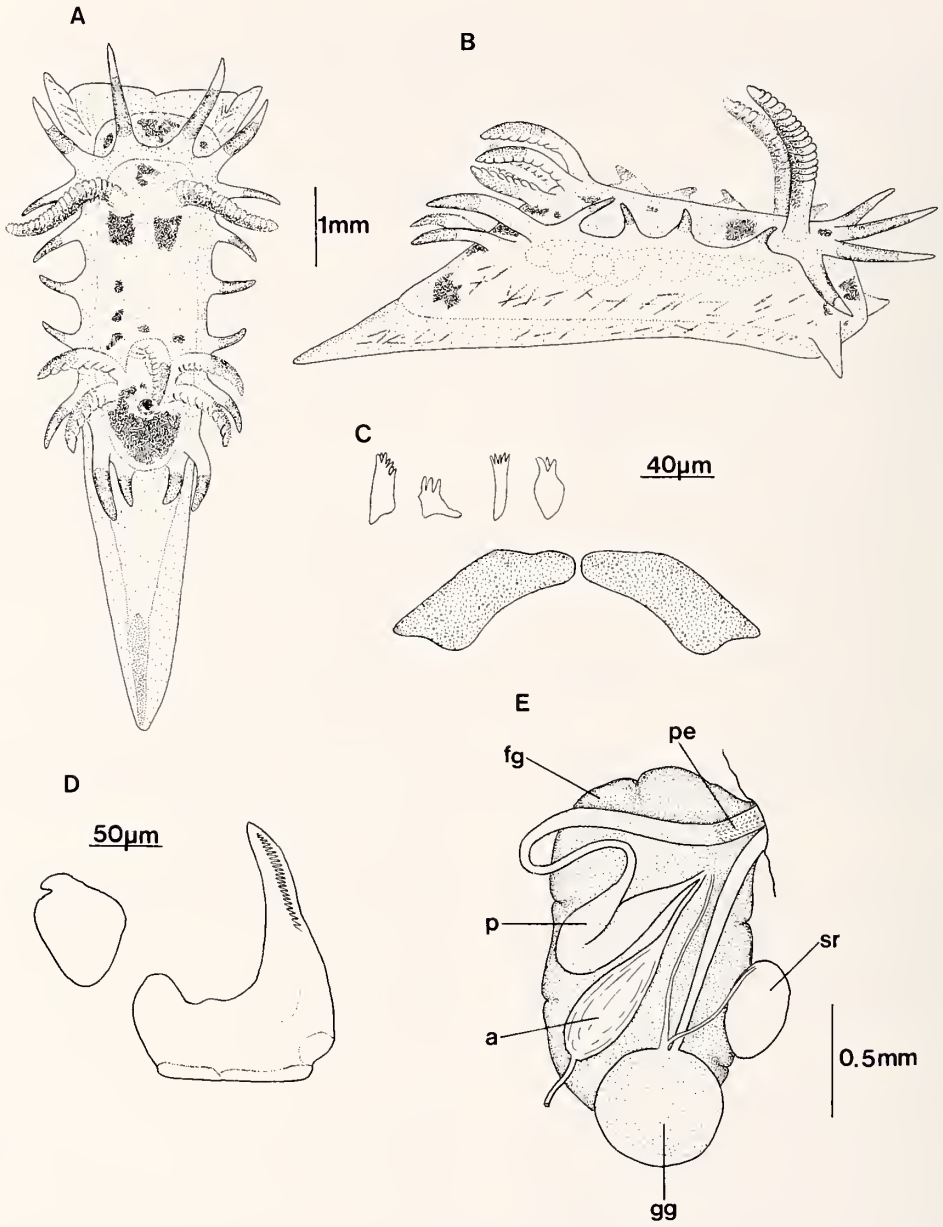

Figure 7

Okenia ***hispanica*** Valdés & Ortea, sp. nov., A. dorsal view of the living animal, B. lateral view of the living animal, C. lateral view of the labial cuticle and detail of some elements, D. radular teeth of a half row, E. reproductive system: a, ampulla; fg, female gland; gg, gametolytic gland; sr, seminal receptacle; p, prostate; pe, penis.

to separate these two species on the basis of radular morphology.

Another species that is similar to *O.* ***hispanica*** is *O. mediterranea.* Both species can be easily separated on the basis of the external features, mature *O. mediterranea* possessing at least one row of tubercles on its dorsum. The jaw anatomy of *O.* ***hispanica*** differs from that of *O. mediterranea.* The former species bears denticles with up to seven cusps, whereas *O. mediterranea* never has more than five. Also, *O.* ***hispanica*** has 12 rows of penial hooks, whereas only nine rows occur in *O. mediterranea.*

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